Ministry of
Northern Development
and Mines

Ontario

Mines and Minerals Division
Ontario Geological Survey

Open File Map 200

Quaternary Geology of the Eastern Half of the Barrie and Elmvale Map Areas

Scale 1:50 000

1000 m 0 1 2 km

UNEDITED MANUSCRIPT

This unedited Open File Map is presented for viewing in order to provide early access to recent geoscience mapping. It will be available for on-request viewing and photocopying at the Resident Geologist's office in London, Ontario Geological Survey Mines Library – Sudbury, and the Mines and Minerals Information Centre Library – Toronto. Open File Maps are also available for sale at the Natural Resources Information Centre.

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:

Barnett, P.J. 1992. Quaternary geology of the eastern half of the Barrie and Elmvale map areas; Ontario Geological Survey, Open File Map 200, scale 1:50 000.

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Open File Map

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LEGEND

PHANEROZOIC

CENOZOIC

QUATERNARY

RECENT

18 **Fluvial sediments:** very fine- to coarse-grained sand, gravel, silt and clay.

17 **Wetland sediments:** peat, muck and marl.

16* **Lacustrine beach and bar sediments:** gravel, sandy gravel and gravelly sand.

15* **Lacustrine coarse-grained sediments:** very fine- to medium-grained sand, silt, minor clay.

14* **Lacustrine fine-grained sediments:** silt- and clay-dominated rhythmites.

PLEISTOCENE

13 **Fluvial or deltaic sediments:** very fine- to coarse-grained sand, minor gravel, silt and clay.

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- 10b silt-dominated rhythmites,
- 10a clay and silt rhythmites.

9 **Glaciofluvial ice-contact stratified sediments:** fine- to very coarse-grained sand, gravelly sand and gravel, minor amounts of silt, clay and flowtill.

8 **Till:** variable grain-size distribution;
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4* **Till:** stone-poor, clayey silt to silt.

3* **Till:** stony, gritty, silty sand to sandy silt.

PALEOZOIC

ORDOVICIAN

2* **Bedrock:** exposed or with a very thin, less than 1 m, cover of Quaternary sediments.

PRECAMBRIAN

1* **Bedrock:** exposed or with a very thin, less than 1 m, cover of Quaternary sediments.

NOTE: In general sediments less than 1 m thick are not indicated on this map.

* Unit not present on this map.

SYMBOLS

Geological boundary (approximate, gradational).

Drumlin.

Glacial fluting.

Crag-and-tail

End moraine ridge crest.

Ice-contact slope.

Tunnel valley or channel.

Area of ice-disintigration ridges.

Kettle hole; kame.

Area of hummocky topography or area of extensive kettles.

Fluvial terrace escarpment.

Abandoned shore bluff.

Abandoned beach, bar or spit.

Area of small dunes.

Landslide scar.

Margin of large slump block

Lineation on air photographs

Ⓕ Fossil locality

Bedrock escarpment.

Ⓚ Area of karst (solution weathering).

Sand and gravel pit.

Quarry.

SOURCES OF INFORMATION

Base map derived from Map 31D/5 (Barrie) of the National Topographic System; scale 1:50 000.

Aerial photography by the Ontario Ministry of Natural Resources, Toronto and National Airphoto Library, Ottawa.

Image analysis by Ontario Centre for Remote Sensing.

Deane, R.E., 1950. Pleistocene geology of the Lake Simcoe District, Ontario; Geological Survey of Canada, Memoir 256, 108p.

Magnetic declination approximately 9° 03′ in 1978.

CREDITS

Geology by P.J. Barnett, 1989, 1991.

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Issued 1992.

Explanatory Notes

for the east halves of the

Elmvale (31D/12) and Barrie (31D/5)

Area

by: Peter J. Barnett, May, 1992

Introduction:

These explanatory notes are to accompany Open File Maps XXXX and XXXX of the Ontario Geological Survey. It is hoped that they will help the users of these maps understand the distribution of the various surface sediments in these map areas.

The Quaternary geology of the east half of the Elmvale area was mapped during a two week period in 1986 and during the summers of 1988 and 1989. The east half of the Barrie area was mapped during the summers of 1989 and 1991. Field work consisted of the examination of sediments exposed naturally, such as in river and creek cuts and in excavations such as ditches, sand and gravel pits and quarries. Air photographs were used extensively throughout the mapping project. Competent field assistance was provided by R.I. Kelly and R.S Delorme in 1986, R. Campbell in 1988, D. Babuin in 1989 and D.A. Kelly in 1991.

Previous mapping in the area has been done by R. E. Deane for the Geological Survey of Canada and published at a scale of 1:126 720 (Deane 1950).

Bedrock geology:

Precambrian rock outcrops along the northern margin of the Elmvale area. It consists predominantly of felsic igneous rocks and gneisses of sedimentary origin (Ontario Geological Survey 1991). These rocks form the southern edge of the Canadian Shield.

Paleozoic rock also outcrops in the northern part of the area. It consists of Ordovician carbonate and clastic rocks that outcrop in outliers on the Canadian Shield and along the erosional edge of the Paleozoic strata of southwestern Ontario (Michigan and Appalachian sedimentary basins).

Several quarries have been developed in the Paleozoic rock of the area including the Uhthoff and Medonte (Coldwater) quarries. For discussions of the geology, operations, processing and products of these quarries please refer to the publication "Limestone Industries of Ontario, Volume III" (Derry Michener Booth and Wahl and Ontario Geological Survey 1989).

Quaternary deposits and landforms:

The Quaternary sediments in the east half of the Elmvale vary in thickness from 0 to greater than 200 m (Burwasser and Ford 1974a). Sediments in the east half of the Barrie area exceed 50 m in thickness with some areas reported greater than 150 m (Burwasser and Ford 1974b). The Quaternary sediments within the map area occur in 2 physiographic regions of southern Ontario: the Simcoe uplands and the Simcoe lowlands (Chapman and Putnam 1984).

The Simcoe uplands are areas of broad rolling till plains separated by steep-sided, broad, flat-floored valleys. The Simcoe lowlands include these broad valleys as well as the low-lying area north and east of Coldwater. Up to 100 m of elevation separates the upland surfaces from the lowlands.

The steep-walled valleys form a part of a larger valley system. They extend between the Niagara Escarpment and the pPrecambrian Shield and are thought to be tunnel valleys: valleys carved subglacially by the catastrophic release of meltwater. The occurrence of double intake channels, erosional streamlined forms and eskers within the valleys and the steep, streamlined valley walls are suggested as evidence to support this origin (Barnett 1986, 1990).

Other dominant landforms in the area include: a large interlobate moraine, drumlins, tunnel channels, wave-cut

bluffs and platforms, beach bars and spits and a pattern of sub-parallel sinuous ridges referred to by Deane (1950) as "ice-block ridges".

The age of the glacial sediments in the Elmvale area is not known with certainty. The surface till units (map unit 8) are probably of Late Wisconsinan age. The older tills (map units 3 and 4) may also have been deposited during the Late Wisconsinan, however, they could be substantially older.

For the most part, the glacial deposits are related to ice moving toward the south southwest, except for the fine-grained till (map unit 4) which may have been deposited by ice flowing toward the southeast (personal communications A.F. Bajc, Ontario Geological Survey, April 1992).

The Simcoe uplands are composed of several layers of till interbedded primarily with glaciolacustrine sediments. The older layers of till (map units 3 and 4) and glaciolacustrine sediments (map units 5 and 6) are exposed along the valley walls where they have been truncated during valley formation or subsequent shoreline erosion. The lowlands are underlain by lacustrine, glaciolacustrine and glaciofluvial sediments and commonly by a layer of till resting on the bedrock surface.

The upland areas and valley walls are draped by glacial deposits consisting of a conformable sequence composed of stratified sand and gravel (map unit 7), lodgement till, melt-out till and flowtill (all included in map unit 8). The surface is drumlinized and contains low sinuous ridges that are aligned roughly parallel to the orientation of the valley walls. Many irregular-shaped bodies of ice-contact stratified sands and gravelly sands (map unit 9), and glaciolacustrine sands, silts and clays (map units 10 and 11a and b) also occur on this surface and were deposited during ice stagnation.

Inundation of the area by regional post-glacial lakes followed ice marginal recession. Evidence of 1 or 2 lake levels above the main phase of glacial Lake Algonquin exists in the Gilchrist area. Whether these shoreline deposits are Early Lake Algonquin or of glacial Lake Schomberg has yet to be determined. Shorelines and basin deposits of the glacial Lake Algonquin series of lakes are well represented in the area (map units 10, 11 and 12). Sediments of the Nipissing Great Lakes also occur in the northern part of the area mapped (map unit 14, 15 and 16).

Postglacial erosion has extensively modified the landscape. Slope failures have widely occurred along slopes composed of silts and very fine sands (map unit 5b). In areas of complex and varying stratigraphy piping of sands and s lts

have created theater-like scarps. One of the best examples is Horseshoe Valley. Gullying has also been extensive, particularly in the fine-grained, low-cohesive sediments along the flanks of the Oro or Bass Lake moraine and tunnel valley margins. Fluvial sediments (map unit 13) have been mapped where the sediments eroded during gullying were deposited. One extensive delta at Carley, deposited into glacial Lake Algonquin, was fed by nonglacial-fed rivers.

Wetlands occur in 3 main settings: 1) on low-relief lake plain surfaces on tunnel valley floors; 2) in kettle holes; and 3) in scour pools and tunnel channels on the upland surfaces.

Sand and gravel is being extracted from several deposit types in the area. Pits exist in ice-contact deposits associated with tunnel valleys and in deposits formed during ice stagnation, including the Oro or Bass Lake moraine. Beach bars and spits are also sources for sand and gravel in the area.

References:

Barnett, P.J. 1986. Quaternary geology of the eastern halves of the Barrie and Elmvale Areas, Simcoe County; *in* Summary of Field Work and Other Activities, 1986, Ontario Geological Survey, Miscellaneous Paper 132, p. 193-194.

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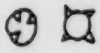
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